

Listing of Claims

This listing of claims replaces all prior claims of the captioned patent application.

Claim 1. (currently amended) A platen for use in a chemical mechanical planarization (CMP) system, comprising:

a structure configured with at least two apertures, one or more of the at least two apertures defining at least one localized fluid-pressure platen zone, one or more of the at least two apertures defining at least one fluid-bearing platen zone configured to allow a flow of fluid-bearing fluid, the fluid-bearing fluid having a tendency to freely-flow from the at least one fluid-bearing platen zone out of the platen; and

a membrane covering all of the one or more of the at least two apertures that define each of the at least one localized fluid-pressure platen zones, the membrane being configured with a first section sealed to the structure around the all of the one or more of the at least two apertures defining the at least one localized fluid-pressure platen zone so that, in response to fluid of the respective at least one localized fluid-pressure platen zone, the sealed membrane is extendable into the fluid-bearing fluid of the at least one fluid-bearing platen zone.

Claim 2. (currently amended) A platen as recited in claim 1, wherein:

the membrane is configured with the sealed a first section is sealed fluid-tight secured-around the all of the one or more of the at least two apertures.

Claim 3. (currently amended) A platen for use in a chemical mechanical planarization (CMP) system, comprising:

a structure configured with at least two apertures, one or more of the at least two apertures defining at least one localized fluid-pressure platen zone, one or more of the at least two apertures defining at least one fluid-bearing platen zone configured to allow a flow of fluid-bearing fluid, the fluid-bearing fluid having a tendency to freely-flow from the at least one fluid-bearing platen zone out of the platen; and

a membrane covering the one or more of the at least two apertures that define each of the at least one localized fluid-pressure platen zones, the membrane being configured so that in response to fluid of the respective at least one localized fluid-pressure platen zone, the membrane is extendable into the fluid-bearing fluid of the at least one fluid-bearing platen zone, the membrane being configured with a first section secured to the structure around the one or more of the at least two apertures. A platen as recited in claim 2, wherein: the membrane being is configured with a second section surrounded by the first section, and

the extendable configuration of the membrane comprises the second section having a flexible characteristic for movement relative to the respective one or more of the at least two apertures in response to the fluid of the respective at least one localized fluid-pressure platen zone, the movement of the second section extends the second section into the flow of the fluid-bearing fluid.

Claim 4. (previously amended) A platen as recited in claim 3, wherein:

the movement of the second section relative to the respective one or more of the at least two apertures is movement away from the respective one or more of the at least two apertures in response to the fluid of the at least one localized fluid-pressure platen zone.

Claim 5. (previously amended) A platen as recited in claim 3, wherein:

the movement of the second section relative to the respective one or more of the at least two apertures is movement toward the respective one or more of the at least two apertures in response to the fluid of the at least one localized fluid-pressure platen zone.

Claim 6. (currently amended) A platen as recited in claim 3 +, wherein:

the one or more of the at least two apertures defining at least one localized fluid-pressure platen zone comprises at least two apertures each defining one of the localized fluid-pressure platen zones;

the membrane covers the one or more of the two apertures defining one of the localized fluid-pressure platen zones; and

the platen comprises a second membrane covering one or more other of the at least two apertures, those other apertures define a second of the localized fluid-pressure platen zones, the second membrane is also configured to be extendable in response to fluid of the respective second localized fluid-pressure platen zone, the configuration of the second extendable membrane permits extension of the second membrane into the flow of the fluid-bearing fluid;

the two extendable membranes cooperate to reduce the tendency of the fluid-bearing fluid of the localized fluid-bearing platen zones to freely-flow out of the platen .

Claim 7. (currently amended) A platen as recited in claim 3 +, wherein:

the at least one localized fluid-pressure platen zone is defined by a plurality of the at least two apertures, the plurality of the at least two apertures are organized in separate groups, each separate group corresponding to a different one of the localized fluid-pressure platen zones; and

the membrane comprises a separate membrane covering each separate group of the plurality of the at least two apertures, each separate membrane is configured so that the separate membranes are separately extendable into the flow of the fluid-bearing fluid in response to fluid-pressure fluid of a respective one of the localized fluid-pressure platen zones.

Claim 8. (previously amended) A platen for use in a chemical mechanical planarization (CMP) system, comprising:

at least one fluid-bearing platen zone having a plurality of fluid-bearing outlets for supplying fluid-bearing fluid, the at least one fluid-bearing platen zone being disposed below and being capable of providing fluid-bearing pressure on a polishing pad; and

at least one fluid-pressure platen zone comprising at least one fluid-pressure port for transferring fluid-pressure fluid relative to the at least one fluid-bearing platen zone and the polishing pad, the at least one fluid-pressure platen zone being disposed below the polishing pad, each of the at least one fluid pressure platen zones further comprising a member configured to define a flexible pocket covering the at least one fluid-pressure port of the respective fluid-pressure platen zone to prevent the fluid-pressure fluid from freely-flowing relative to the respective fluid-bearing zone, the flexible pocket of each of the at least one fluid-pressure platen zones being configured to extend into the fluid-bearing fluid supplied from the fluid-bearing outlets .

Claim 9. (previously amended) A platen as recited in claim 8, wherein:

the fluid-pressure fluid transferred by the at least one fluid-pressure port flexes the respective membrane to configure the respective pocket; and

the configuration of each respective flexible pocket to extend into the fluid-bearing fluid restricts flow of the fluid-bearing fluid from the platen.

Claim 10. (previously amended) A platen as recited in claim 9, wherein a value of fluid-pressure of the fluid-pressure fluid transferred by the at least one fluid-pressure port is a static pressure value that is controlled relative to a value of a pressure of the fluid-bearing fluid.

Claim 11. (previously amended) A platen as recited in claim 8, wherein a value of fluid-pressure of the fluid-pressure fluid in each of the flexible pockets is a static pressure having a value in a range of pressure from about 1 to 2 psi greater than a value of a pressure of the fluid-bearing fluid.

Claim 12. (previously amended) A platen as recited in claim 8, wherein:

the free-flow of the fluid-bearing fluid is a tendency to freely-flow from the at least one fluid-bearing zone and out of the platen; and

the extension of each flexible pocket into the fluid-bearing fluid restricts the tendency of the fluid-bearing fluid to freely-flow out of the platen.

Claim 13. (previously amended) A platen as recited in claim 8, wherein:

the fluid-bearing outlets of the at least one fluid-bearing zone are located at a position corresponding to a central area of a wafer to be polished so that the fluid-bearing fluid tends to freely-flow in a fluid-bearing gap away from the position to provide the fluid-bearing pressure to the polishing pad; and

the fluid-pressure fluid transferred relative to the at least one fluid-pressure port of the at least one fluid-pressure zone is capable of deforming each member into the fluid-bearing gap to restrict the tendency of the fluid-bearing fluid to freely-flow

in the fluid-bearing gap away from the position while the fluid-bearing fluid still provides the fluid-bearing pressure to the polishing pad.

Claim 14. (currently amended) A platen for use in a chemical mechanical planarization (CMP) system in which a polishing pad is configurable to apply selected polishing pressures to different areas of a wafer to be planarized, the platen comprising:

a fluid-bearing structure configured with a first plurality of apertures for transferring polishing pressure control fluid, the apertures being configured to define a plurality of localized fluid-pressure platen zones for applying selectable polishing pressure control pressures to the polishing pad; and

a membrane corresponding to each localized fluid-pressure platen zone, each membrane covering respective ones of the apertures corresponding to a respective one of the localized fluid-pressure platen zones, each membrane being sealed to the fluid-bearing structure around the respective ones of the apertures to separate the polishing pressure control fluid of the respective localized fluid-pressure zone from the fluid-bearing structure, the sealing of each membrane enabling different selectable localized fluid pressures to be applied to each localized fluid-pressure platen zone to provide differential polishing pressure control pressures to the polishing pad;

the fluid-bearing structure being further configured with a second plurality of apertures for supplying fluid-bearing fluid between the respective membranes and the polishing pad.

Claim 15. (previously amended) A platen as recited in claim 14, wherein:

the second plurality of apertures is configured to define a second plurality of localized fluid-bearing zones for supplying fluid-bearing fluid to support the polishing pad, the fluid-bearing structure is further configured with a gap between the respective membranes and the polishing pad, the gap is normally open to permit relatively free-flow of the fluid-bearing fluid to exit the fluid-bearing structure; and

each of the membranes is sealed to the fluid-bearing structure along the gap and responds to the polishing pressure control fluid from one or more of the apertures of the respective first plurality of apertures to restrict the gap and limit the flow between the respective membranes and the polishing pad of the fluid-bearing fluid from the fluid-bearing structure.

Claim 16. (original) A platen as recited in claim 15, wherein:

each sealed membrane responds to the polishing pressure control fluid by becoming inflated to define a pocket that extends at least partially across the gap to limit the flow of the fluid-bearing fluid from the fluid-bearing structure.

Claim 17. (previously amended) A platen as recited in claim 14, wherein:

the polishing pad is configured as an endless belt;
the fluid-bearing fluid from the second plurality of apertures of the fluid-bearing structure provides a gap filled with the fluid-bearing fluid for supporting the endless belt spaced from the platen; and

each membrane is reconfigured by the polishing pressure control fluid received from the respective first plurality of apertures of the plurality of the

respective localized fluid-pressure platen zone so that the reconfigured membrane enters the gap and restricts the flow of the fluid-bearing fluid through the gap.

Claim 18. (currently amended) A method of limiting consumption of fluid by a platen of a chemical mechanical planarization system, comprising the operations of:

providing the platen with a first aperture communicating with a self-contained localized fluid-pressure platen zone;

providing the platen with a second aperture for defining at least one fluid-bearing platen zone;

admitting fluid-bearing fluid into the second aperture, the fluid-bearing fluid tending to flow from the second aperture and out of the platen; and

admitting fluid-pressure fluid into the first aperture so that the self-contained localized fluid-pressure platen zone separates the fluid-pressure fluid of the localized fluid-pressure zone from the fluid-bearing platen zone limits the flow of the fluid-bearing fluid out of the platen .

Claim 19. (currently amended) A method as recited in claim 18, wherein the platen defines a gap between a polishing pad and the platen, wherein:

the admitting fluid-pressure fluid operation comprises the operations of:

transferring the fluid of the localized fluid-pressure platen zone relative to the first aperture to cause the self-contained localized fluid-pressure platen zone to apply a self-contained localized planarization pressure to the polishing pad in a fluid-tight manner; and

controlling the transferring operation to control the self-contained localized planarization pressure applied via the polishing pad to a workpiece and to control the limited flow of the fluid-bearing fluid out of the platen .

Claim 20. (currently amended) A method ~~as recited in claim 18, of limiting consumption of fluid by a platen of a chemical mechanical planarization system, comprising the operations of:~~

providing the platen with a first aperture communicating with a self-contained localized fluid-pressure platen zone;

providing the platen with a second aperture for defining at least one fluid-bearing platen zone, wherein the platen is a fluid-bearing platen and defines a fluid-bearing gap between a polishing pad and the fluid-bearing platen, the fluid-bearing gap extending outwardly from a central platen zone to the self-contained localized fluid-pressure zone;

configuring the fluid-bearing platen with at least one self-contained localized fluid-pressure zone outwardly of the central platen zone and having a flexible membrane; and

admitting fluid-bearing fluid into the second aperture, the fluid-bearing fluid tending to flow from the second aperture and out of the platen; and

admitting fluid-pressure fluid into the first aperture so that the localized fluid-pressure platen zone limits the flow of the fluid-bearing fluid out of the platen, controlling wherein the admitting fluid-pressure fluid operation is controlled to cause the membrane to control a localized fluid-pressure applied to the polishing pad and a resulting localized planarization pressure applied via the polishing pad to a workpiece, wherein the membrane enters the gap to restrict the flow of the fluid-bearing fluid through the fluid-bearing gap and out of the platen.